

July 24, 1956

D. E. LAWSON ET AL
BEVERAGE DISPENSING APPARATUS

2,755,979

Filed Dec. 21, 1951

3 Sheets-Sheet 1

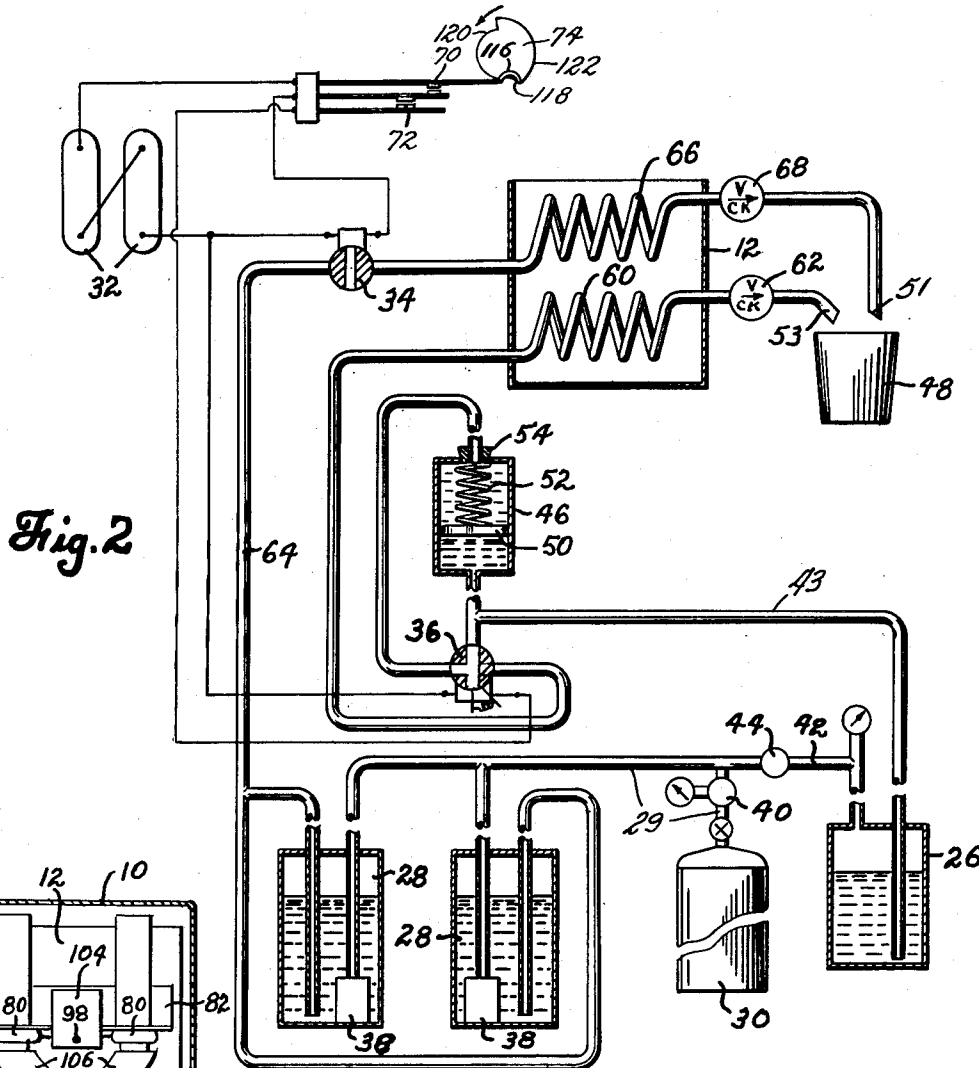
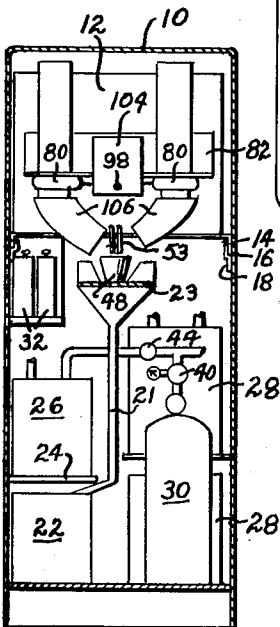
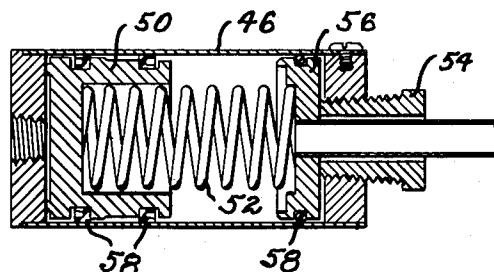


Fig. 3

Fig. 1

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3 Sheets-Sheet 2

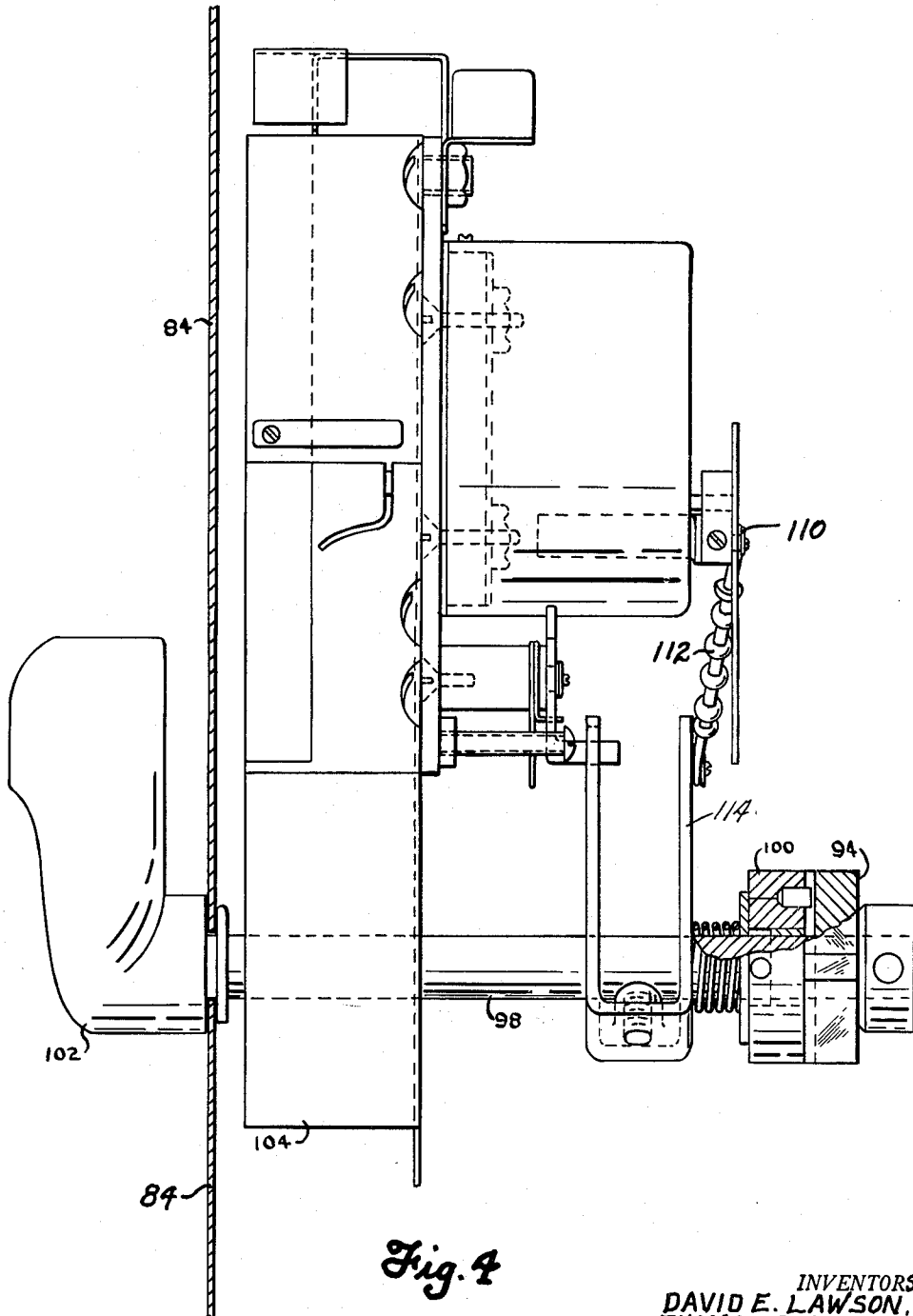


Fig. 4

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3 Sheets-Sheet 3

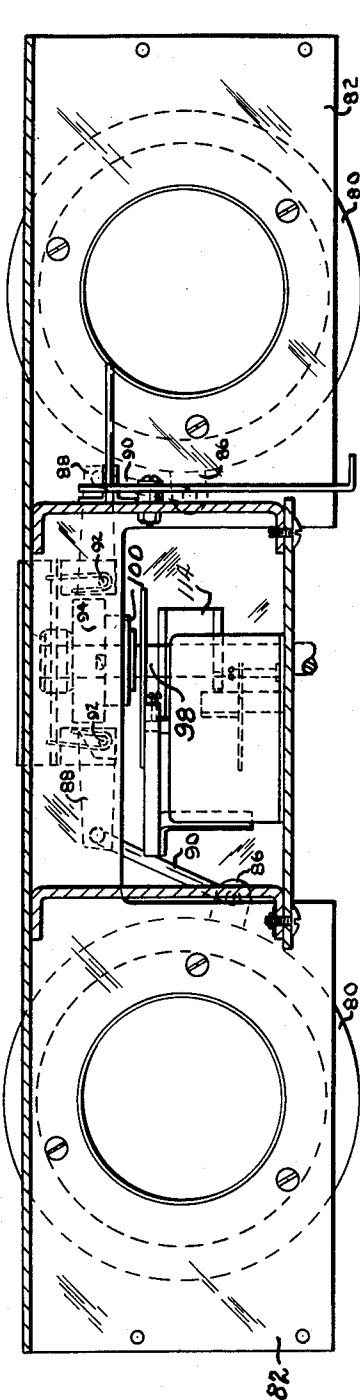


Fig. 6

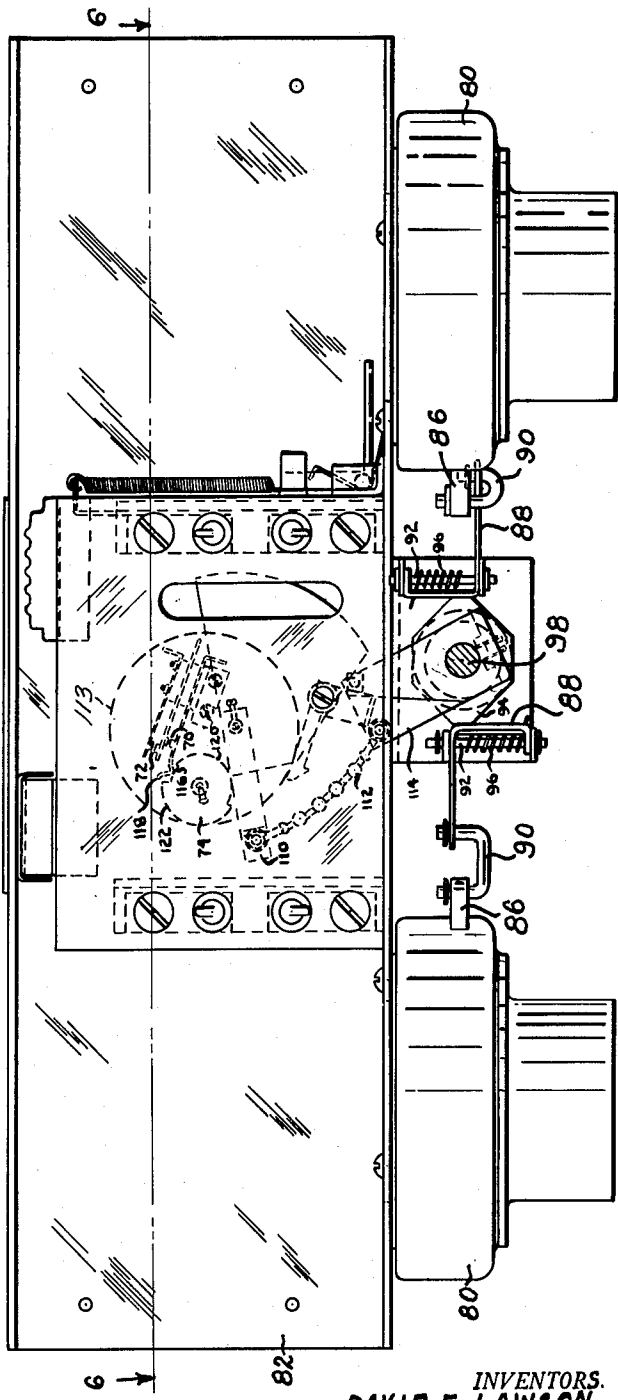


Fig. 5

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2,755,979

BEVERAGE DISPENSING APPARATUS

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Application December 21, 1951, Serial No. 262,762

9 Claims. (Cl. 226—46.4)

This invention relates to refrigerating apparatus and more particularly to a self-contained motorless machine for use in dispensing refrigerated carbonated drinks.

There are many places where a coin operated drink vending machine could be used to great advantage but wherein there are no provisions for supplying either water or electricity for operating a conventional drink vending machine. Thus, golf clubs find it profitable to sell cold drinks out on the golf course between the ninth and tenth holes where there are no water or electrical connections. Likewise, there is a big demand for portable drink vending machines that may be used at such places as picnics, carnivals, athletic events, on shipboard, et cetera. The conventional drink vending machines are unsuitable for such use, as they require water connections and 110 volt, 60 cycle current for their operation. Furthermore, there are many places, especially in foreign countries, where the supply of electrical energy is not of standard voltage or frequency, with the result that the ordinary drink dispensing machines cannot be used without being provided with special motors and the like. It is an object of this invention to provide a self-contained motorless machine which may be sold for use in foreign countries and in localities where one cannot connect the equipment to a standard source of power or a source of water.

More particularly, it is an object of this invention to provide a drink dispensing machine in which two 6 volt dry cell battery units are used for controlling the timing equipment.

It is another object of this invention to provide an improved arrangement for cooling, measuring and dispensing the ingredients forming the finished drink.

Another object of this invention is to provide a drink vending machine in which an improved syrup metering device is located ahead of the cooling coil, so that the syrup is not required to pass through the metering device after it has been cooled.

It is a further object of this invention to provide an improved timing arrangement for controlling the flow of carbonated water and syrup into a cup or the like.

Another object of this invention is to provide an improved arrangement for dispensing cups in a drink vending machine.

Another object of this invention is to provide a drink vending machine in which an improved liquid feed arrangement is provided in which the pressure of the carbon dioxide gas is used for forcing the carbonated water and the syrup into a drinking cup in a predetermined sequence.

A further object of this invention is to provide a drink vending machine in which an improved arrangement of parts is provided whereby the supply of syrup, water, ice, and cups may be replenished with ease.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

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In the drawings:

Figure 1 is an elevational view, with parts broken away, showing somewhat diagrammatically the arrangement of the parts within the outer cabinet;

Figure 2 is a diagrammatic view showing the basic controls for the system;

Figure 3 is a sectional view showing the construction of the syrup metering cylinder;

Figure 4 is a side elevational view showing the construction and arrangement of the manual operator and the timer mechanism;

Figure 5 is a front elevational view showing the cup dispensing mechanism and its relationship to the timer mechanism; and

Figure 6 is a horizontal sectional view taken on line 6—6 of Figure 5.

Referring now to the drawings wherein there is shown a preferred embodiment of the invention, reference numeral 10 generally designates an outer housing or casing which serves to enclose and support all of the ingredients and mechanism necessary for serving a cold carbonated beverage. Since the device is intended to be entirely self-contained and to be used in locations where neither water nor electric connections are available, the ingredients used for dispensing the drinks are chilled by means of ice which is adapted to be placed in an ice receptacle 12 mounted in the upper portion of the casing 10, as shown in Figure 1. This ice receptacle is removably held in place within the casing by means of downwardly projecting flanges 14 which engage within a channel 16 formed by spot welding the sheet metal strip 18 to the inside walls of the casing 10. The ice receptacle 12 is spaced from the front wall of the casing so as to provide room for a pair of cup dispensers 80 and their associated operating mechanism which will be described more fully hereinafter.

A removable drain tank 22 is provided in the bottom portion of the casing underneath a drain spout 21 which conveys any water or syrup which may be spilled onto the cup shelf 23 carried by the front wall of the cabinet. A shelf 24 is provided within the casing for supporting a syrup can or receptacle 26 from which flavoring material is adapted to be supplied for the drinks to be dispensed. The casing 10 also houses a pair of carbonated water tanks or receptacles 28 and a CO₂ drum 30. Dry cell units 32, commonly referred to as hot-shot batteries, are also provided within the casing for supplying electrical energy for operating a pair of solenoid valves 34 and 36 which control the flow of syrup and carbonated water into the drinking cup 48 which is automatically delivered onto the cup shelf just before the valves are opened, as will be explained more fully hereinafter.

Referring now to Figure 2 of the drawings wherein there is schematically shown the various fluid flow circuits, it will be noted that the CO₂ drum 30 supplies CO₂ to conventional stone CO₂ diffusers 38 located adjacent the bottoms of the water receptacles 28, so as to maintain the water in these receptacles properly carbonated. A relatively high pressure regulator valve 40 is provided in the line 29 leading from the drum 30 to the diffusers 38 whereby the pressure within the water receptacles is maintained at a predetermined relatively high value for a purpose to be explained more fully hereinafter. CO₂ gas is also supplied to the syrup receptacle 26 through the line 42 in which a relatively low pressure regulator 44 is provided. This regulator 44 maintains a predetermined gas pressure within the syrup receptacle sufficient to cause the syrup in the receptacle to flow out through conduit 43 to a metering cylinder 46 and finally into the drinking cup 48.

The metering cylinder 46 floatingly supports a piston 50 (see Figures 2 and 3). A spring 52 biases the piston

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50 into the down position, as viewed in Figure 2, for a purpose to be explained more fully hereinafter. The stroke of the piston 50 may be adjusted by the stop 54 which is threadedly secured to the one end of the metering cylinder 46, so as to make it possible to adjust the amount of syrup dispensed into each cup. As best shown in Figure 3, the adjustable stop serves to engage a piston-like element 56 which in effect serves as an adjustable end wall for the metering cylinder. By screwing the adjustable stop 54 inwardly, the element 56 is forced to move against the pressure of the spring 52 towards the floating piston 50. When the adjustable stop is screwed outwardly, the spring 52 causes the element 56 to follow up the movement of the stop, with the result that it is not necessary to directly attach the element 56 to the stop 54. Suitable gaskets 58 are provided, as best shown in Figure 3, for preventing leakage of syrup past the piston and stop.

Syrup under pressure is free to flow from the syrup receptacle 26 into the lower end of the metering cylinder at all times, whereas the upper end of the syrup cylinder is only connected to the syrup supply when the three-way valve 36 is moved into a position in which it connects the syrup supply to the upper end of the metering cylinder, in which case the combined pressure of the syrup plus the force of the spring 52 serves to force the floating piston 50 downwardly to the extreme lower end of the metering cylinder. When the three-way valve is energized and thereby shifted into the position in which the syrup from the upper end of the cylinder is free to flow toward the syrup outlet 53, the upper end of the metering cylinder is no longer subjected to the relatively high pressure corresponding to the pressure in the syrup receptacle but is subjected to a lower pressure determined by the pressure required to open the check valve 62 and consequently the relatively high syrup pressure acting against the lower end of the piston serves to push the piston upwardly and thereby force the syrup to flow out through the three-way valve into the syrup cooling coil 60 and eventually into the cup 48 through the check valve 62. The check valve 62 is set to open at a pressure sufficiently less than that of the syrup pressure within the syrup metering cylinder, so as to cause the syrup to be dispensed when the valve 36 is energized.

The syrup cooling coil 60 is arranged in the ice receptacle 12 so as to cool the syrup after it leaves the syrup metering cylinder and immediately before being dispensed. By virtue of this arrangement, the relatively warm and free flowing syrup only is required to be handled by the metering cylinder and the solenoid valve 36. By providing a check valve at the outlet of the syrup cooling coil, the syrup is maintained under pressure at all times until it is dispensed, even though the syrup control valve 36 is mounted ahead of the syrup cooling coil 60.

The carbonated water leaves the carbonators or water receptacles 28 through the line 64 which leads to a water cooling coil 66 also disposed within the ice receptacle 12. The solenoid valve 34 controls the flow of carbonated water into the water cooling coil 66. A check valve 68 is provided at the outlet of the water cooling coil for controlling the discharge of carbonated water through the nozzle 51 into the cup 48. The check valve 68 is set to open at a pressure slightly below the pressure of the carbonated water in the line 64. By virtue of the above arrangement, it is possible to place the main water control solenoid valve 34 ahead of the water cooling coil and still maintain the carbonated water in the water cooling coil under pressure.

The solenoid valves 34 and 36 are connected into the electric circuit as shown in Figure 2 and are adapted to be energized from the dry cell batteries 32. A pair of cam operated switches 70 and 72 are provided as shown in Figure 2 and are under control of a clock operated cam 74 which serves to operate the valves 34 and 36 in

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a predetermined sequence. As explained more fully hereinafter, the cam 74 first serves to close the switch 70, so as to open the water valve 34 for a period of approximately seven seconds. During the last three seconds of the dispensing operation, the switch 72 is also closed, so as to manipulate the syrup dispensing valve 36 whereby a predetermined quantity of syrup is supplied to the cup 48. The pressure maintained within the syrup receptacle 26 is sufficient to cause the piston 50 to move from its lowermost position to its uppermost position during the three seconds' interval, with the result that a metered amount of syrup is allowed to flow into the cup before the three-way valve shuts off the flow of syrup to the syrup cooling coil. It is apparent from the above that the amount of water dispensed is determined by the length of time that the valve 34 remains open and the water pressure tending to force the water out, whereas the amount of syrup dispensed is determined solely by the adjustment of the stop 54 in the syrup metering cylinder. It is obvious, therefore, that the ratio of syrup to water may be adjusted from time to time without redesigning the cam 74 or substituting a new cam.

Two cup dispensing units 80 are supported on a bracket 82, which in turn is supported on the front door 84 of the casing. Each of the cup dispensing units is of the type which includes an oscillating lever 86 for dispensing cups therefrom. Inasmuch as cup dispensing units of this type are old and well known in the art, the details of the cup dispensing units have not been shown. Each of the oscillating levers 86 is connected to a cam follower 88 by means of a lever 90. The cam followers 88 are pivotally supported on pins 92. Each of the cam followers 88 is biased into engagement with the cam actuator 94 by means of a spring 96 which is arranged as shown. The cup dispensing cam 94 is rotatably supported on the operating shaft 98 which supports a ratchet device 100 which serves to drive the cam 94 when the shaft 98 is oscillated through an angle of 90 degrees. The shaft 98 is adapted to be manually driven by the handle 102. For purposes of illustrating the invention, we have shown a device in which a conventional coin operated clutch device 104 is interposed between the handle 102 and the shaft 98, so it is necessary to insert a coin into the device 104 in order to key the handle 102 to the shaft 98. Inasmuch as coin operated devices of this type are well known in the art and inasmuch as the details of construction thereof may be varied without departing from the spirit of the invention, it is not considered necessary to encumber this disclosure with a detailed showing and description of the coin operated device.

Upon insertion of the coin, rotation of the handle through 90° causes rotation of the shaft 98 through 90°, with the result that the cup dispensing cam 94 rotates through a 90° arc. In order to dispense a cup from either one of the cup dispensing mechanisms, it is necessary, however, to rotate the cam 94 through 180° so that the handle 102 must be oscillated through 90° twice in order to operate either cup dispenser. It will be noted that the arrangement is such that the cups will be dispensed alternately first from the one cup dispenser and then from the other. In other words, when the cam 94 serves to dispense a cup from one of the dispensers, it will also be cocking the other cup dispenser, so that upon the next operation of the handle, this other cup dispenser will be ready to drop a cup into one of the chutes 106. As best shown in Figure 1, the cup dispensers are mounted on opposite sides of the coin chute 104 and a pair of cup conveying chutes 106 is arranged to direct the cups onto the shelf 23.

Rotation of the shaft 98 also operates the timer actuator lever 110 through the chain 112 which has its one end connected to a lever 114, which in turn is keyed to the shaft 98. The timer 113 is a conventional timer which serves to operate the cam 74, which in turn operates the switches 70 and 72. The cam 74 is provided with a valley

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or low spot 116 which is incapable of moving the switch actuator 118 into switch closing position. A first raised portion 120 is provided on the cam which serves to hold the switch 70 closed throughout 160° of travel of the cam 74. A second raised portion 122 serves to hold both the switch 70 and the switch 72 in the closed position throughout approximately 160° and at the end of 320° both switches are opened as a result of the switch actuator 118 dropping into the valley 116. Thus, it follows that the water dispensing solenoid valve 34, which is controlled by the switch 70, will remain open for a period of approximately seven minutes, which is the time required for the timer to rotate the cam 74 through 320°, and the syrup dispensing valve 36 will be set to dispense syrup during the last half of the dispensing cycle, with the result that a minimum amount of release of carbon dioxide from the water will take place and yet the syrup will be properly mixed with the water.

In order not to needlessly complicate the disclosure, the usual coin return mechanism and other safety features which come into operation, such as when the supply of cups is exhausted, will not be described. Any well known features for serving this purpose may be used without departing from the spirit of the invention claimed herein.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described our invention, we claim:

1. In a self-contained carbonated beverage dispensing apparatus, a casing, a pressure tank within said casing for supplying carbon dioxide under pressure, a syrup receptacle within said casing, conduit means for supplying CO₂ under pressure from said tank to said syrup receptacle, a pressure regulating means in said conduit means so as to maintain the syrup in said receptacle at a predetermined pressure, carbonator means in said casing including a water receptacle, means for supplying CO₂ from said tank to the water in said water receptacle at a relatively high pressure, a syrup cooling coil in said casing, a water cooling coil in said casing, means for supplying carbonated water from said water receptacle to said water cooling coil including a solenoid operated valve located at the inlet to said water cooling coil, a carbonated water dispensing nozzle, means including a check valve for connecting said nozzle to the outlet of said water cooling coil, a syrup dispensing nozzle, a syrup metering cylinder, a piston movable in said cylinder, spring means for biasing said piston in the one direction within said cylinder, means forming a direct connection between said syrup receptacle and a first end of said metering cylinder and including a solenoid operated three-way valve, means for selectively connecting the inlet of said syrup cooling coil to either end of said metering cylinder and for connecting the second end of said cylinder to said syrup receptacle when the first end of said cylinder is connected to said syrup cooling coil, dry cell battery means within said casing, circuit means for connecting said solenoid valves to said dry cell battery means, and manually actuated timing means for controlling the energization of said solenoid valves.

2. In a self-contained carbonated beverage dispensing apparatus, a casing, a pressure tank within said casing for supplying carbon dioxide under pressure, a syrup receptacle within said casing, conduit means for supplying CO₂ under pressure from said tank to said syrup receptacle, a pressure regulating means in said conduit means so as to maintain the syrup in said receptacle at a predetermined pressure, carbonator means in said casing including a water receptacle, means for supplying CO₂ from said tank to the water in said water receptacle at a relatively high

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pressure, a syrup cooling coil in said casing, a water cooling coil in said casing, means for supplying carbonated water from said water receptacle to said water cooling coil including a solenoid operated valve located at the inlet to said water cooling coil, a carbonated water dispensing nozzle, means including a check valve for connecting said nozzle to the outlet of said water cooling coil, a syrup dispensing nozzle, a syrup metering cylinder, a piston movable in said cylinder, spring means for biasing said piston in the one direction within said cylinder, means forming a direct connection between said syrup receptacle and a first end of said metering cylinder and including a solenoid operated three-way valve, means for selectively connecting the inlet of said syrup cooling coil to either end of said metering cylinder and for connecting the second end of said cylinder to said syrup receptacle when the first end of said cylinder is connected to said syrup cooling coil, dry cell battery means within said casing, circuit means for connecting said solenoid valves to said dry cell battery means, and manually actuated timing means for controlling the energization of said solenoid valves, said last named means serving to first open said first named solenoid valve for a predetermined time interval so as to dispense carbonated water into a cup and to thereafter operate said three-way valve to dispense a measured quantity of syrup into the cup.

3. In a self-contained carbonated beverage dispensing apparatus, a casing, a pressure tank within said casing for storing carbon dioxide gas under pressure, a syrup receptacle within said casing, conduit means for connecting said tank to said syrup receptacle, a pressure regulating means in said conduit means so as to maintain syrup in said receptacle at a predetermined relatively low pressure, carbonator means in said casing including a water receptacle, means for supplying carbon dioxide from said tank to the water in said water receptacle at a relatively high pressure, a syrup cooling coil in said casing, a water cooling coil in said casing, means for supplying carbonated water from said water receptacle to said water cooling coil including a solenoid operated valve, a carbonated water dispensing conduit, means for connecting said conduit to said water cooling coil including a check valve whereby the carbonated water in said water cooling coil is sealed therein when said solenoid valve and said check valve are both closed, a syrup metering cylinder, a piston floatingly mounted in said cylinder, spring means for biasing said piston in the one direction within said cylinder, means forming an open connection between said syrup receptacle and a first end of said metering cylinder so as to oppose the force of said spring by the force of syrup under pressure, means for selectively connecting said syrup receptacle to the second end of said metering cylinder or to said syrup cooling coil, said last named means comprising a solenoid operated three-way valve, a syrup dispensing conduit, means including a check valve for connecting said syrup dispensing conduit to the outlet of said syrup cooling coil, said check valve being so constructed and arranged to remain closed at pressures below the pressure in said syrup receptacle, first switch means for controlling the operation of said first solenoid operated valve, second switch means for controlling the operation of said second solenoid operated valve, and means for operating said first and second switch means in sequence.

4. In a self-contained carbonated beverage dispensing apparatus, a carbon dioxide drum, a syrup receptacle, means for supplying carbon dioxide from said drum to said syrup receptacle at a relatively low pressure so as to maintain the syrup in said receptacle at a predetermined pressure, a water receptacle, means for supplying carbon dioxide from said drum to said water receptacle at a relatively high pressure, a syrup cooling coil, a water cooling coil, means for supplying water from said water receptacle to said water cooling coil including a solenoid operated valve, means including a pressure operated check

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valve at the outlet of said water cooling coil for dispensing water therefrom, a syrup metering cylinder, a piston movable in said cylinder, spring means for biasing said piston in the one direction within said cylinder, means forming an open connection between said syrup receptacle and the one end of said metering cylinder, means including a solenoid operated three-way valve for selectively connecting the other end of said metering cylinder to said syrup receptacle or to said syrup cooling coil, a syrup dispensing conduit, means including a pressure operated check valve at the outlet of said syrup cooling coil for dispensing syrup therefrom, first switch means for controlling the operation of said first solenoid operated valve, second switch means for controlling the operation of said second solenoid operated valve, and means for operating said first and second switch means in a predetermined sequence whereby the syrup is not dispensed until toward the end of the water dispensing period.

5 In a self-contained drink dispensing machine, a syrup receptacle, a carbonator including a carbonated water receptacle, a syrup cooling coil, a water cooling coil, a first solenoid operated valve for controlling the flow of water from said carbonator to said water cooling coil, a second solenoid operated valve of the three-way type for controlling the flow of syrup from said syrup receptacle to said syrup cooling coil, timing means for controlling the energization of said solenoid operated valves, a syrup dispensing conduit connected to the outlet of said syrup cooling coil, a carbonated water dispensing conduit connected to the outlet of said water cooling coil, check valves in each of said conduits, means for applying pressure to the syrup in said syrup receptacle, means for limiting the quantity of syrup dispensed when said second solenoid valve is opened, said last named means comprising a cylinder, a piston operable within said cylinder, a spring in a first end of said cylinder for biasing said piston toward the other end thereof, said three-way valve including means for selectively connecting said first end of said cylinder to said syrup supply and thereafter to said syrup cooling coil, and means for continuously connecting the second end of said cylinder to said syrup supply.

6 In a self-contained drink dispensing machine, a syrup receptacle, a carbonated water receptacle, means for supplying CO₂ gas under pressure to said receptacles, a syrup cooling coil, a water cooling coil, a first valve for controlling the flow of water from said water receptacle to said water cooling coil, a second valve for controlling the flow of syrup from said syrup receptacle to said syrup cooling coil, a syrup dispensing conduit connected to the outlet of said syrup cooling coil, a carbonated water dispensing conduit connected to the outlet of said water cooling coil, check valves in each of said conduits arranged to open in response to opening of the respective valves for controlling the flow into said cooling coils, and means for limiting the quantity of syrup admitted to said syrup cooling coil by said second valve irrespective of the length of time said second valve remains open.

7 In a self-contained carbonated beverage dispensing apparatus, a casing, an ice receptacle removably supported within the upper portion of said casing, a CO₂ tank disposed in the lower portion of said casing, a syrup receptacle within said casing beneath said ice receptacle, conduit means for supplying CO₂ under pressure from said tank to said syrup receptacle so as to maintain the syrup therein under a predetermined pressure, carbonator means in said casing including a carbonated water receptacle, means for supplying CO₂ from said tank to said carbonator means, a syrup cooling coil in thermal exchange relationship to the ice in said ice receptacle, a water cooling coil in thermal exchange relationship to the ice in said ice receptacle, means for supplying carbonated water from said carbonator means to said water cooling coil including a solenoid operated valve located at the inlet to said water cooling coil, a carbonated water dispensing nozzle,

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means including a check valve for connecting the nozzle to the outlet of said water cooling coil and for maintaining the carbonated water in said coil under pressure, said check valve being adapted to open so as to allow carbonated water to flow out from said water cooling coil in response to a predetermined increase in pressure of the carbonated water in said water cooling coil, a syrup dispensing nozzle, means for conveying syrup from said syrup receptacle to said syrup cooling coil including a syrup flow control valve, and a syrup metering means for admitting a predetermined quantity of syrup from said syrup receptacle to said syrup conveying means each time said syrup flow control valve is opened.

8 In a self-contained drink dispensing machine, a syrup receptacle, a carbonator including a carbonated water receptacle, a syrup cooling coil, a water cooling coil, means including a first solenoid operated valve for supplying water from said carbonator to said water cooling coil, means including a second solenoid operated valve for supplying syrup from said syrup receptacle to said syrup cooling coil, a first cup dispensing unit having a pivoted lever for operating the same, a second cup dispensing unit having a pivoted lever for operating the same, a cup shelf, first chute means for conveying cups from said first cup dispensing unit to said shelf, second chute means for conveying cups from said second cup dispensing unit to said shelf, a syrup dispensing conduit for conveying syrup from said syrup cooling coil to a cup located on said shelf, a carbonated water dispensing conduit for conveying carbonated water from said water cooling coil to a cup on said shelf, a check valve in each of said conduits, a manual operator mounted for oscillation through a given angle, timing means responsive to oscillation of said manual operator through said given angle for controlling the energization of said solenoid operated valves in a predetermined sequence with respect to each other, rotatable cam means for alternately operating said cup dispensing levers, and ratchet means drivingly connecting said manual operator to said cam means whereby oscillation of said manual operator imparts rotation to said cam means.

9 In a self-contained drink dispensing machine, a syrup receptacle, a carbonator including a carbonated water receptacle, a syrup cooling coil, a water cooling coil, means including a first solenoid operated valve for supplying water from said carbonator to said water cooling coil, means including a second solenoid operated valve for supplying syrup from said syrup receptacle to said syrup cooling coil, a first cup dispensing unit having a pivoted lever for operating the same, a second cup dispensing unit having a pivoted lever for operating the same, a cup shelf, first chute means for conveying cups from said first cup dispensing unit to said shelf, second chute means for conveying cups from said second cup dispensing unit to said shelf, a syrup dispensing conduit for conveying syrup from said syrup cooling coil to a cup located on said shelf, a carbonated water dispensing conduit for conveying carbonated water from said water cooling coil to a cup on said shelf, a check valve in each of said conduits, a manual operator mounted for oscillation through a given angle, timing means responsive to oscillation of said manual operator through said given angle for controlling the energization of said solenoid operated valves in a predetermined sequence, rotatable cam means for operating said cup dispensing levers, and ratchet means drivingly connecting said manual operator to said cam means whereby oscillation of said manual operator imparts rotation to said cam means, said cam means being so constructed and arranged as to operate said pivoted levers alternately whereby cups are dispensed by said cup dispensing units in alternate order.

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